

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Jeremy Stephen Matcham, et al. Art Unit : 1727
Serial No. : 10/584,780 Examiner : Kwang S. Han
Filed : September 28, 2007 Confirmation No.: 7827
Title : WATER MANAGEMENT IN FUEL CELLS

Commissioner for Patents
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PROPOSAL FOR TELEPHONE INTERVIEW

Examiner Han: Attached is a proposal for discussion during out telephone interview scheduled for Wednesday, March 7th at 10:00 AM Eastern.

1. (Currently Amended) A method of operating an electrochemical fuel cell stack comprising a plurality of fuel cells, each of the fuel cells comprising an anode, an ion transfer membrane, and a cathode, the method comprising:

delivering fluid fuel to one or more fluid flow channels in each anode of one or more fuel cells in the electrochemical fuel cell stack;

delivering fluid oxidant to one or more fluid flow channels in each cathode of the one or more fuel cells;

exhausting reaction by-products and unused oxidant from the one or more fluid flow channels in each cathode of the one or more fuel cells; and

delivering a sufficient quantity of liquid water to the one or more fluid flow channels in each cathode of the one or more fuel cells such that a relative humidity of 100% is maintained throughout the one or more fluid flow channels in each cathode of the one or more fuel cells;

wherein delivering the sufficient quantity of liquid water comprises:

determining, for each of a plurality of currents, a maximum voltage for the one or more fuel cells as a function of liquid water flow rate, the each of a plurality of currents being within a range of operating conditions of the one or more fuel cells;

determining a calibration function expressing a minimum liquid water flow rate as a function of current and/or air stoichiometry, the calibration function being determined by variation of water flow rate to the cathode operating at constant current and constant air stoichiometry to determine minimum and maximum water flow rates repeated for a

plurality of stack currents ~~minimum liquid water flow rate being based on a~~
~~corresponding maximum voltage~~; and

delivering at least the minimum liquid water flow rate for a corresponding current
drawn from the one or more fuel cells and/or for the air stoichiometry, the delivered
minimum liquid water flow rate being determined by the calibration function.